

RBC Indices in Rural Pregnant Women in Faridabad Belt

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Abstract: Anemia in pregnancy is a major manifestations and important health issue in India and world. A hospital based; cross sectional study was conducted among 100 pregnant woman of Faridabad belt to know the prevalence of anemia. The study was done at Al-Falah School of medical sciences and research Centre, dhauj, Faridabad, Haryana, India during June 2022 to august 2022. Only the pregnant women, who visited the hospital, were enrolled in this study with consent. According to WHO classification of anemia, my study revealed that 92% participants, were anemic and their mean Hb concentration was in the range of 9.463g/dl. In majority 68% of the subjects, the Hb level was between 8-12 g/dl. In almost all the anemic women, 68% were moderately anemic, while 24% were having the Hb between 4-8 g/dl and they were severely anemic and rest 8% were mild anemic. So, this study shows that anemia was present among the pregnant women of Faridabad belt, Haryana. This study will help the national planning programs for maternal health and to evaluate the results.

Keywords: RBC Indices, Pregnancy, Women, Anemia, WHO

1. Introduction

RBC indices are useful parameters when investigating suspected anemia. They help to provide a general idea of the clinical picture, predict the red blood cell appearance, and in aid of classification of anemia.

It has been estimated, Anemia affects over 800 million women worldwide.

In India, it is classified as a major public health problem and it is estimated that 58.6% of children, 53.2% of non-pregnant women as per the NFHS.

India carries the highest burden of the disease despite having an anemia control program for 50 years.

RBC indices are the part of complete blood count these are used to measure the size shape and quality of the RBC. They are also used to diagnose different types of anemia. RBC Indices are:

1) Mean cell volume (MCV)

- MCV is the measurement of the average red blood cell volume and is used to classify red blood cells based on size

- Normal values 80 – 100fL

2) Mean cell Hemoglobin (MCH)

- MCH is the measurement of the average hemoglobin weight in a red blood cell
- Normal Values 27 – 33 pg.

3) Mean cell Hemoglobin Concentration (MCHC)

- MCHC is the measurement of the hemoglobin concentration in a population of red blood cells. This is used to denote the color of the red blood cell population.
- Normal Values – 34 – 37 g/dl

4) Red blood cell Distribution width (RDW)

- RDW is the coefficient of variation or standard deviation of the MCV. Similar to the RBC indices, it is determined by automated cell counting instruments and is used to predict the degree of red blood cell size variation, known as anisocytosis.
- Normal Values – 11.5 – 14.5.

Anemia is one of the major morbidity factors in the rural setup, leading to severe complications. The prevalence of anemia is inordinately higher among rural women due to low socio-economic status and indigent access.

2. Review of Literature

S. No & Author	Study Purpose	Participants Sample size	Method	Setting	Tool	Findings
01 Patra, Puri, Trivedi, and Pasrija, 2010	Prospective study was undertaken in order to study and critically analyze the socio-demographic and clinical profile of severely anemic pregnant women presenting in the last trimester of pregnancy	Antenatal mothers in their third trimester. (13,786)	Prospective Study	LHMC, Delhi	Questionnaire And Hb levels.	The overall prevalence of anemia was 56.9 and 2.7% presented with severe anemia.
Sharma, Patnaik, Garg and Prema, 2008	To assess anemia, identifying with moderate anemia (Hb between 5.0-7.9 gm/dl) Administering IM therapy (900 mg of elemental iron as iron sorbitol citric acid to them in the OPD and observing the impact on maternal Hb levels and birth weight of the infant.	3,698 pregnant women attending antenatal clinic of urban primary health institution in Delhi, India	Descriptive Study	Urban Primary Health Institution in Delhi.	Questionnaire And Hb levels	80% of 3,698 women were anemic Hb level.754 (20.1%) had Hb between 5.0 and 7.9 gm/dl. The mean Hb 9 weeks after completion of therapy was only 9.6 gm/dl.
03 Rohilla, Raveendran. Dhaliwal and Chopra, 2010	To determine the maternal and perinatal outcome in patients with severe anemia in pregnancy.	4,456 women	Retrospective study	A tertiary hospital, Northern India	Review Health Record (Hospital Data) Hb by Sahil's method.	798 (17.9%) found to be anemic, out of them 96 women had severe anemia; the remaining 702 (15.75%) women had mild to moderate anemia. Of the 96 severely anemic women, six died after admission.
04. Liabsuetrakul T, Chaikongkeit P, Korviwattanagarn S, et al, 2011	To determine the effect of international or Asian criteria-based body mass index (BMI) in predicting maternal anemia, low birth weight (LBW), and preterm births among pregnant women and the change in hemoglobin (Hb) level during pregnancy	1,192 pregnant women	Observational Study.	IN four south most provinces of Thailand	Questionnaire And Hb level.	Overweight and obese women at pre-pregnancy by the Asian criteria-based BMI had a lower prevalence of anemia. The Hb levels did not change significantly over time. In addition to BMI, maternal age, parity and late prenatal visit were independently associated with maternal anemia, low birth weight, and preterm birth.

Objective

- 1) To determine the prevalence and determinants of blood Hb level and mild moderate and severe anemia and the RBC indices.
- 2) To determine biological, nutritional and socio-economic risk factors in the rural women.
- 3) To compare the MCV, MCH, MCHC & RDW levels to distinguish the anemic.
- 4) To determine the ESR in detection of inflammation from the autoimmune disease's infection cancer and more.

3. Methodology

The hospital based, cross-sectional, descriptive study was conducted in the pathology department and in OBG department of a rural hospital. After permission of the proposal the study was conducted for 2 months duration among indoor patients selecting the first complete hemogram report after admission. Red cell indices will be derived from analyzer. Blood smear stained by Leishman-Giemsa will be examined under light microscope. Data will

be analyzed at the end of the study using Microsoft Excel software 2010.

- 1) List the red blood cell parameters of the complete blood count (CBC).
- 2) Describe the principle of analysis for each of the red blood parameters of the CBC.
- 3) Explain the disadvantages of relative reticulocyte counts.
- 4) Given relative reticulocyte counts and red blood cell counts, calculate absolute reticulocyte counts.
- 5) Given a relative reticulocyte count and patient hematocrit and morphology, calculate the corrected reticulocyte count and reticulocyte production index, when needed.
- 6) Given the red blood cell parameters of a CBC, compare each to the reference interval and apply proper terminology to the interpretation of results outside the reference interval.
- 7) Given red blood cell parameters of a CBC, apply a methodical approach to assess the validity and reportability of results.
- 8) Apply a methodical approach to red blood cell parameters of the CBC to assess diagnostic and clinical significance.

4. Results

A total of 100 subjects were studied. The mean age of the women was 17-25 years.

The percentage of the women who were less than 18 years was only 2%.

A majority (82%) of the pregnant women were in the 20-30 years.

The overall mean Hb level was 9.463 mg/dl. The mean Hb levels were slightly increased with the advanced age.

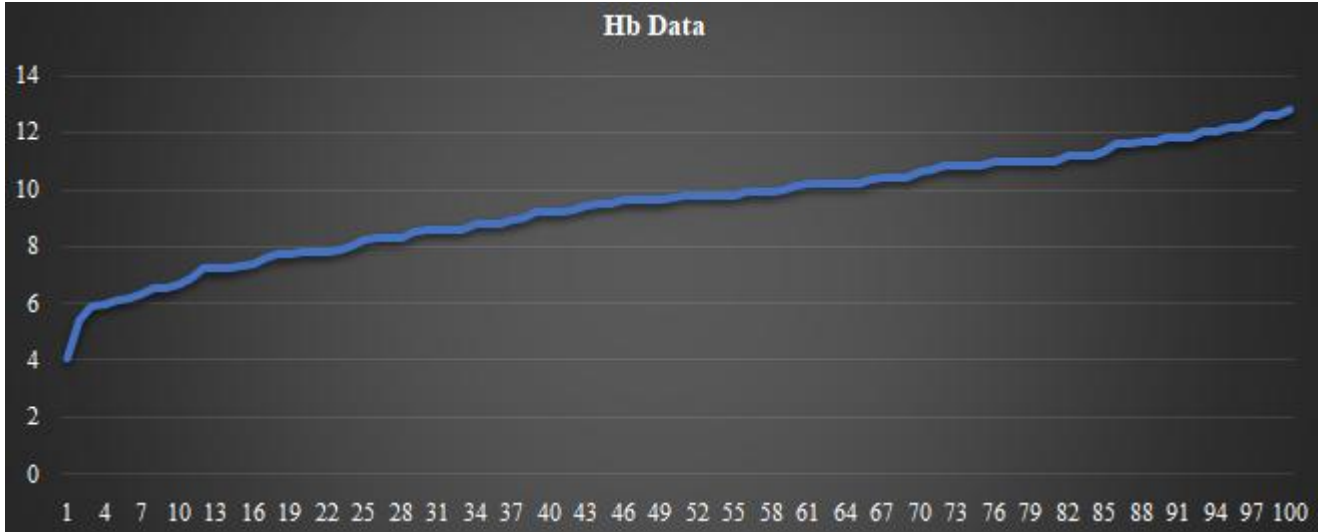


Figure 1: Shows the Hb concentration for all the subjects. The range varies from 4.1-12.8 g/dl.

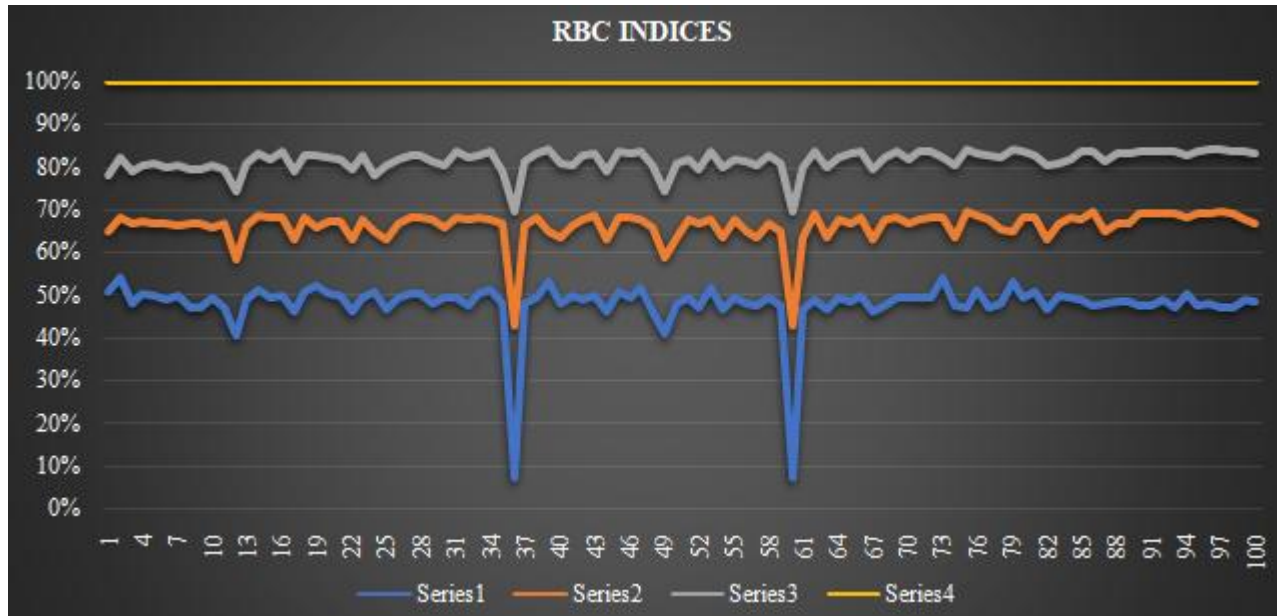


Figure 2: Shows the RBC indices for the entire subject

Series1-MCV
 Series2-PCV
 Series3-MCH
 Series4-MCHC

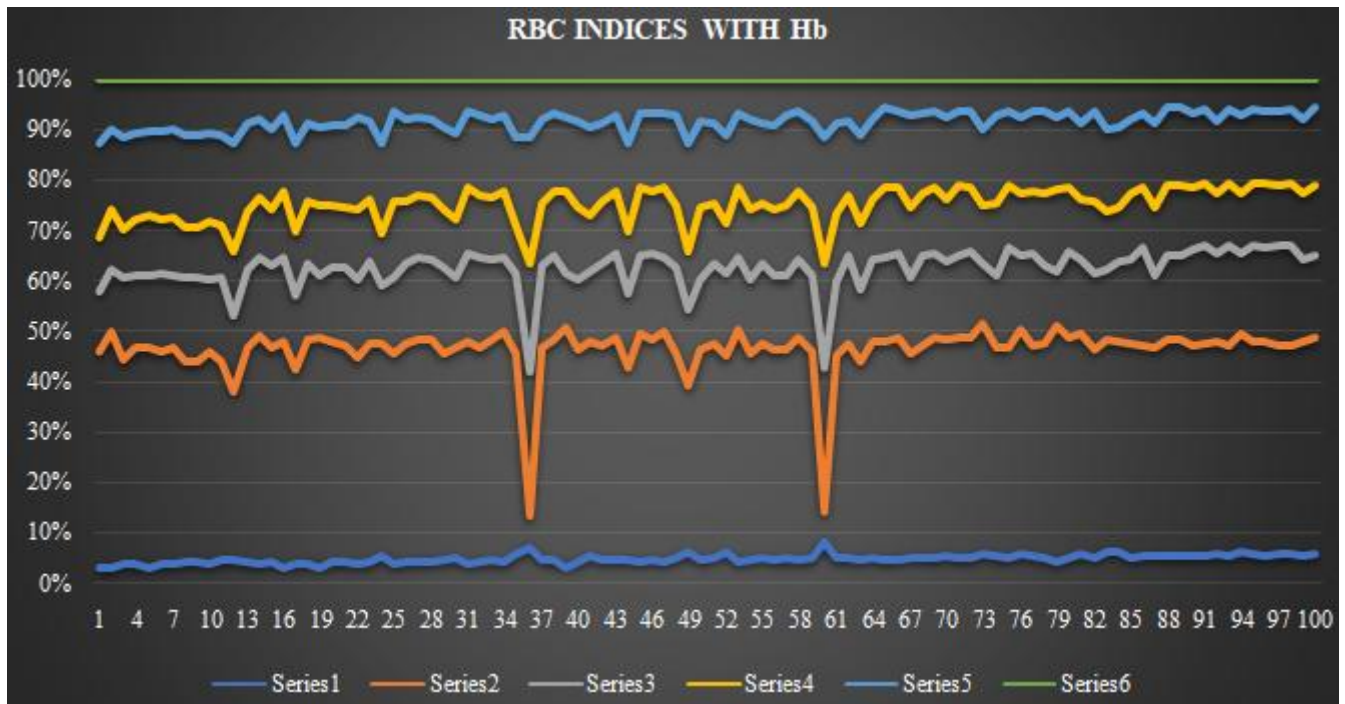


Figure 3: Shows the comparison of Hb with RBC Indices.

Series1-Hb

Series2-MCV

Series3-PCV

Series4-MCH

Series5-MCHC

Series6-RDW

The severity of anemia according to age groups has been shown above in the figures. All the subjects were observed to be anemic in the present study.

The study shows that:

Mild anemia-8%

Moderate anemia-68%

Severe anemia- 24 %

5. Discussion

The study findings showed that prevalence of anemia during pregnancy from the two selected health centers in AL FALAH SCHOOL OF MEDICAL SCIENCES AND RESEARCH CENTRE was 92.0%. Anemia in pregnancy was not associated with adverse pregnancy outcomes in this setting.

Indian Council of Medical Research surveys showed that over 70% of pregnant women in the country were anemic. Maternal anemia is considered as risk factor for poor pregnancy outcomes, and it threatens the life of fetus. Available data from India indicate that maternal morbidity rates are higher in anemic women. There is a substantial amount of evidence showing that maternal iron deficiency anemia early in pregnancy can result in LBW subsequent to preterm delivery.

6. Conclusion

The study suggests that all the moderate and severe anemic women's Hb have the direct relation with RBC Indices.

The current study was undertaken to determine the RBC Indices in pregnant women in Faridabad belt.

No previous report was available on this ethnic group and this study was done to produce a baseline data for the public health interventions.

The possible explanations of the lower RBC Indices among the Faridabad belt were their inadequate dietary intake, lower social economic class, and not proper hygiene.

In conclusion, anemia in pregnancy is alarmingly high amongst the Faridabad population. These findings are useful for our maternal health program planners and implements to target and evaluate interventions for the improvement of this ethnic group.

7. Summary

As per my study, anemia in pregnancy is alarmingly high amongst the Faridabad population, which needs to be managed efficiently by the health authorities by implementing maternity health projects.

8. Implications

- 1) Rural Women of reproductive age have high mortality rate, this study will help in understanding the cause and will help in decreasing the mortality.
- 2) Nutritional deficiencies, primarily iron, are the main leading cause of anemia in rural women. This study will

help in tackling the aforementioned situation, keeping in mind the socio-economic status of the rural women.

- 3) On basis of this study, government can improve the effectiveness of the ongoing schemes which have been implemented. E.g., "Anemia Mukht Bharat".
- 4) Anemic pregnant women may deliver low birth weight, anemic infant. This is a major contributing factor in the high infant mortality rate in rural areas.

By countering the anemic status in pregnant women, we can in turn decrease/improve the infant mortality rate in rural areas.

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